## REMARKS/ARGUMENTS

### Introductory Remarks

Claims 1, 3-16, 19-26, 29-32, 38-45, 47-52, 54, 56, 58-60, 62-68, 70, 72, and 74-85 are pending in the application. Claims 1, 10, 13, 14, 26, 38, 39, 48, 51, and 56 have been amended. The amendments do not include new matter. Claims 2, 4, 11, 16-18, 27-28, 33-37, 41, 46, 53, 55, 57, 61, 69, 71, and 73 have been canceled. New claims 74-85 have been added herein. New claims 74-85 do not involve new matter. Support for new claims 74-85 can be found throughout the specification, e.g. in Example 6, at p. 43-47 of the 60/439,376 ('376 application), filed 01/10/2003.

### Interview Summary

Applicants' attorney Stankovic conducted a telephonic interview with Examiner Medina on April 27, 2009, in order to address outstanding rejections in the present application. In particular, claim amendments to overcome the rejections were discussed. The Examiner is thanked for her consideration in this matter.

### Priority

The Office Action contends that the disclosure of the prior-filed provisional patent application, No. 60/439,376 ('376 application), filed 01/10/2003, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. § 112 for one or more claims of the application. In particular, the Office Action contends that the nucleic acid sequences of SEQ ID NOs:4 and 7 and the polypeptide sequences of SEQ ID NOs:5 and 8 are not disclosed in the provisional application. The Office Action therefore contends that "the effective filing date of claims drawn to SEQ ID NO:4, 7, and nucleic acids encoding SEQ ID NO:5 and 8 is 01/12/2004." Applicants respectfully disagree.

1. Disclosure of BAC clone 177O13 in the '376 parent application

First, as indicated in the '376 provisional (parent) patent application, the inventors identified, **disclosed BAC clone 177O13**, and used it for the isolation of the late blight resistance gene of the present invention (e.g., page 39 and SEQ ID NO:1 of the '376 parent application). Therefore, the inventors' disclosure of the BAC clone 177O13 in the '376 parent application, filed 01/10/2003, was before the effective filing date of the Jacobus *et al.* patent application, U.S. 20030221215A1, filed 02/07/2003. It is noted that the Office Action refers to the 20030221215A1 patent application as Allefs *et al.*

Second, the Office Action indicates that "the BAC clone was publicly available as of 05/23/03 which is after the affective filing of Allefs et al." That is not relevant, as the inventors disclosed BAC clone 177O13 in the '376 parent application that was filed on 01/10/2003, which is prior to the effective filing date of the Jacobus *et al.* patent application, U.S. 20030221215A1, and prior to the public disclosure of the BAC clone.

2. Disclosure of SEQ ID NO:4 in the '376 parent application

First, shown in SEQ ID NO:4, at p. 69-71 of the '376 parent application, is a "nucleic acid sequence of disease resistant gene, gene 2 (cloned by PCR). Two exons are highlighted in bold. A single intron is underlined." ('376 application, p. 69; see also Appendix I). When these two identified exons, shown in bold, are joined together, the resulting nucleic acid sequence is **100% identical to the nucleic acid sequence of SEQ ID NO:4** of the instant application. The '376 parent application thus identifies and points out the "two exons" (shown in bold) that need to be joined together and the "single intron" (underlined) that needs to be removed in order to obtain a coding region. Because the specification refers to two exons and a single intron, and graphically describes them (bold and underlined, respectively), one skilled in the art would know to join the two exons together while removing the single intron, in order to obtain the coding region of SEQ ID NO:4. Therefore, the nucleic acid sequence

of SEQ ID NO:4 of the instant application was fully disclosed in the '376 application.

Second, the entire nucleic acid sequence of SEQ ID NO:4 of the instant application is also shown in the '376 parent application in Example 6, at p. 43-47 of the '376 application (see also Appendix II), in a nucleic acid comparison (alignment). As indicated at p. 43, l. 57-58 of the '376 parent application, the top sequence in the comparison presented in Example 6 refers to the "gene 2 coding region from the resistant homolog". This nucleic acid sequence, disclosed in the '376 parent application, is **100% identical to the nucleic acid sequence of SEQ ID NO:4** of the instant application. In order to advance prosecution of the present application, Applicants request that the Examiner point out the alleged differences in the sequences.

3. Disclosure of SEQ ID NO:5 in the '376 parent application

Shown as SEQ ID NO:5, at p. 71 of the '376 parent application (see also Appendix III), is a "Gene 2 protein sequence (from the resistant homolog)". This amino acid sequence, disclosed in the '376 parent application, is **100% identical to the amino acid sequence of SEQ ID NO:5** of the instant application. Therefore, the amino acid sequence of SEQ ID NO:5 of the instant application was fully disclosed in the '376 parent application. In order to advance prosecution of the present application, Applicants request that the Examiner point out the alleged differences in the sequences.

Accordingly, Applicants respectfully request that the instant application is accorded the correct priority date that corresponds to the date of the filing of the '376 parent provisional patent application, i.e., **January 10, 2003**. Amended claims 1, 10, 13, 14, 26, 38, 39, 48, 51, and 56, and claims dependent from these amended claims, should be accorded the correct priority date that corresponds to the date of the filing of the '376 parent provisional patent application, i.e., **January 10, 2003**.

**Claim Rejections - 35 U.S.C. §102**

Claims 1,3-16, 19-22, 24-26, 29-32, 38-41, 43-45, and 66 are rejected under 35 U.S.C. 102(e) as allegedly being anticipated by Jacobus *et al.*, U.S. 20030221215A1, published 11/27/2003 (Jacobus). It is noted that the Office Action refers to the 20030221215A1 patent application as Allefs *et al.* Jacobus is published after the priority date of the present patent application (i.e., after 1/10/2003). Therefore, Jacobus does not qualify as a 35 U.S.C. 102(e) reference. Applicants respectfully request that this rejection be withdrawn.

**Claim Rejections - 35 U.S.C. §103**

It is not clear from the Office Action which claims have been rejected under 35 U.S.C. 103(a), as allegedly being obvious over Jacobus *et al.*, U.S. 20030221215A1, published 11/27/2003 (Jacobus) in view of Staskawics et al., US 6,166,295 (Staskawics). However, because Jacobus is published after the priority date of the present patent application (i.e., after 1/10/2003), Jacobus does not qualify as a 35 U.S.C. 103(a) reference. Applicants respectfully request that this rejection be withdrawn.

**SUMMARY**

The claims at issue distinguish over the cited references and are in condition for allowance. Applicants respectfully request the Examiner grant early allowance of this application. The Examiner is invited to contact the undersigned attorney for Applicants via telephone at (312) 321-4254 if such communication would expedite this application.

Respectfully submitted,

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## Appendix I





NLRALTSLDISDNVEATSLPEEMFKSLANLKYLKISFFRNLKELPTSLASLNALKSLKFEFCDALESLPE
EGVKGLTSLTELSVSNCMMLKCLPEGLQHLTALTTLTITQCPIVFKRCERGIGEDWHKIAHIPYLTLYE

**SEQ ID NO:4**: Nucleic acid sequence of disease resistant gene, gene 2 (cloned by PCR). Two exons are highlighted in bold. A single intron is underlined.

CGGGATCCTGTCACATAAATTGACACAAAGGGAGTACTTGTTAATGTTGTAATTATTGGCGAACAATAAT
GTTGTTGATTATCACTTTCTGAATAAGTGTTGTGTCACTTGGAAAAAACACCAAATAGAACTATTCATGT
TTTTTCTTTAGTATATATAAATATGATCTTTAACTTAATTTCAGCAGACAGTCATGATCTTTAACTTTAA
ATGTGCACAAGTAGATTGACAGGCTTGCTAATTGAGTGTCTGTTATAATCAGTATTAAATACTCTCAAGG
TAATAGTATATTCCAGACAAATTTTGTGTTACCAAATTAAATATATTTCTAAAACTCTCCTCAAAGTAGT
TAATATACTTTTGAGTGTTGTATCATGTTTTTAATATAAAATGTTAAAATTTAGATGAAATTTACTTTCT
AGTTAAATTGGTCAAAGTTGAAAGAATTTCAAGTGAAAAAGTTTTTAATAATTTGACTTTTATGCTATAT
TTTTTTAAAGTTGAACGACTTTTTAATAAAAAAGAATAATAAAATTATATGATAATTTTTATAATACAAT
GGCCTTTATATGATGAAAAAAAAAGAAAGAAATTAGATGACAACAATGTCCAAAAATAATCTTAAAGAAT
TACGATTTATATATAATAAAATTAAATTTAAAATTTGATGAAAAAATAGAGAAAAGAGGAAGATGATGAA
GTGAAATGACGTGGTGGTGGGTCCATGTGACATAAAAAAAAATTCTCTTAAATAATCCTTTCATACTAAT
GATAAATTTTTTTTTTTTTTTTTTTTTTACTAATTGCGTATAGAGAAAAGGAAAATGGGGCGGTAATTAC
AAAGTAGGGAATCGAACTTTATCAACAAGTTGAGAGTTCAAGTAATCAACCAACTAAACTACTAAAATTT
TTCTAATTAATGATAATTGTAATTCATTTAGCATAAAAAATTTCATTGCACTTACTTTTAGAGTTTTGAA
AACAGTACTTCATCTATTCTATATTAATTAAATTTTCTATATTAATTAAATTTGTGAGGTAATACAAACT
TATTAAGAAAAATATTTAAGGACATAATTTAACTCATATTTTTCACTATTGTTTTTTGTGAAATCATAAA
TATAACTTTGTAAATAGTGCAATTTATCTCCTAGAAGCAAATTTCACCAAAGAAAAGGGCAAAGATGGAA
AAGAAACTAAATATTCATCTTAAACTTTGAACAATTCAATTATTTTGAACAATGAAAAAAATCTCAAAAA
TTCAATTAATATGAAATGGAGAGAGTAACTTTATTTTAGAGGCAAAAAATTAGTACTCCATCCGTTCACT
TTTATTTGTCATGTTGCGCTTTTCGAAAGTCAATTTGACTAATTTTTAAAGCTAAATTAGATTACACTAA
TTCAATATTTTAAACAGAAAAATTAGATATTCAAAAACTATACAAAAAATATTATACATTGCAATTTTTT
GCATATCAATATGATAAAAAAATATATTGTAAAATATTAGTCAAAATTTTTATAGTTTGACTCTAATCAT
GAAAAGTATAATAATTAATAGTGGACGGAGGAAGTATTGTCTTTCCAGATTTGTGGCCATTTTTGGGCCA
AGGGCCATTAGCAGTTCTCTTCATTTTCTACTTCTGTCTCATATTAGATGGGCATCTTACTAAAAATATT
TGTCTCATATTACTTGATTATTTATTAAATCAAAAAGAATTAATTAATTTTTTCTCATTTTACCCCTACA
ATTAATATAGTTTTAAAAGTTTTAAACAAATTTTGAAGAATCAAAATTTCTTTTTGCAAGAGACTTATTA
ATATAAACAAAGGATAAAATAATAAAATTTGTCAATTTATTGACGATCACTTAATAATCATATAAAATAG
AATATGTTTATCTAATATGAGACGGAGAAAATATATCCTAAAATATTTTTGGACAGATATGTGATATTCT
AACCATTCACTAGACTATATTATGCATTTTAGCCGCCAATGACTTATTTCAGCTTTAATTAATTAGGAAA
GAGGAAACTGCCAATGAGGAAGAGTAGGGGCGTAGTTGCTGTCGACGAAAAAAAGATAATACTCACTCTT
TTCGATTTTTATTTTTATTTATCACTTTTAACCTATCATGTAAAAAGATAATTATTTTTTTCATGCTTTA
TCCTTAGTATTAAACAATTTAATAGGGATTATTTTGTAAAATATTTATATGAATAATTGTTTTCGTAATG
AATTTGTCCGGTCAAACAATGATAAATAAAAACGAATGAAGAGAGTAGAAAACAAAACAAAAGAACAAGT
TGACAACTTGAGAGATTAAAAGGGTCCAAAACGCCTTGGATTTTGAGATTCCATATGTGAAATTTCCATG
AAATAATTGAATTTGTATTATTACAAGTCAAACTTCCCATTTCATTCCAACTAGCCATCTTGGTTTCAAA
ATTACACATTCATTCATTCACAGATCTAATATTCTTAATAGTGATTTCCACAT**ATGGCTGAAGCTTTCAT**
**TCAAGTTCTGCTAGACAATCTCACTTCTTTCCTCAAAGGGGAACTTGTATTGCTTTTCGGTTTTCAAGAT**
**GAGTTCCAAAGGCTTTCAAGCATGTTTTCTACAATTCAAGCCGTCCTTGAAGATGCTCAGGAGAAGCAAC**
**TCAACAACAAGCCTCTAGAAAATTGGTTGCAAAAACTCAATGCTGCTACATATGAAGTCGATGACATCTT**
**GGATGAATATAAAACCAAGGCCACAAGATTCTCCCAGTCTGAATATGGCCGTTATCATCCAAAGGTTATC**
**CCTTTCCGTCACAAGGTCGGGAAAAGGATGGACCAAGTGATGAAAAAACTAAAGGCAATTGCTGAGGAAA**
**GAAAGAATTTTCATTTGCACGAAAAAATTGTAGAGAGACAAGCTGTTAGACGGGAAACAGGT**ACTCATCT
TAAATTAGAATTACAACAACTAAGTTTATATTCATTTTTTTGGCAATTATGAAATTCAGAAAAGGGTTAA
ATATACTCATGTCCTATCGTAAATAGTGTAAATATACCTCTCGTTGTACTTTCGATCTGAATATACTTGT
CAAATCTGGCAAGCTCAGAATCAAATTATCCACCCCAACTTTTAAATACTCGATATCTTTAGAAATCCAC
CTGTCTAACTCATCCACTACCCATTCCCTTTGCTTTGAATTCTTTTCTTTACCTATAAACGTGGAACACT
CGATCCGTTTTGCTTTTCTTAACAAAGCAGCTCAGAGAAAAGAGGTTTTCTTCTATTCTGTTTCTCTGTG
TGCTGCACTTGGGTCCTTAATCCCATTAAAAACAGGGCATGTTAATCCCAACGACGGTAGCCTTTCCTGA
CAGCTGACTGTAAATTTTGTCTAACAAAGAAAAAAAAAGATTAGACATGTTTTTCCTTGTCATTGATTAG
GCTGGATTTCTTTCAGAGTGGAACATAGGGGATATATTGGACCAAAAGTAGAATGGGTATATATTTAAAG

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TATTTCTGATAGAACAGGAGTATATTGTGCGAAAATATCCTCTATTTTCTGTTGTCTCCTAATGAGTTTG
AATGTAATAATATTCTCATGTGGACATTGCTTGCACCAGGTTCTGTATTAACCGAACCGCAGGTTTATGG
AAGAGACAAAGAGAAAGATGAGATAGTGAAAATCCTAATAAACAATGTTAGTGATGCCCAACACCTTTCA
GTCCTCCCAATACTTGGTATGGGGGGATTAGGAAAAACGACTCTTGCCCAAATGGTCTTCAATGACCAGA
GAGTTACTGAGCATTTCCATTCCAAAATATGGATTTGTGTCTCGGAAGATTTTGATGAGAAGAGGTTAAT
AAAGGCAATTGTAGAATCTATTGAAGGAAGGCCACTACTTGGTGAGATGGACTTGGCTCCACTTCAAAAG
AAGCTTCAGGAGTTGCTGAATGGAAAAAGATACTTGCTTGTCTTAGATGATGTTTGGAATGAAGATCAAC
AGAAGTGGGCTAATTTAAGAGCAGTCTTGAAGGTTGGAGCAAGTGGTGCTTCTGTTCTAACCACTACTCG
TCTTGAAAAGGTTGGATCAATTATGGGAACATTGCAACCATATGAACTGTCAAACCTGTCTCAAGAAGAT
TGTTGGTTGTTGTTCATGCAACGTGCATTTGGACACCAAGAAGAAATAAATCCAAACCTTGTGGCAATCG
GAAAGGAGATTGTGAAAAAAAGTGGTGGTGTGCCTCTAGCAGCCAAAACTCTTGGAGGTATTTTGTGCTT
CAAGAGAGAAGAAAGAGCATGGGAACATGTGAGAGACAGTCCGATTTGGAATTTGCCTCAAGATGAAAGT
TCTATTCTGCCTGCCCTGAGGCTTAGTTACCATCAACTTCCACTTGATTTGAAACAATGCTTTGCGTATT
GTGCGGTGTTCCCAAAGGATGCCAAAATGAAAAAAGAAAAGCTAATCTCTCTCTGGATGGCGCATGGTTT
TCTTTTATCAAAAGGAAACATGGAGCTAGAGGATGTGGGCGATGAAGTATGGAAAGAATTATACTTGAGG
TCTTTTTTCCAAGAGATTGAAGTTAAAGATGGTAAAACTTATTTCAAGATGCATGATCTCATCCATGATT
TGGCAACATCTCTGTTTTCAGCAAACACATCAAGCAGCAATATCCGTGAAATAAATAAACACAGTTACAC
ACATATGATGTCCATTGGTTTCGCCGAAGTGGTGTTTTTTTACACTCTTCCCCCCTTGGAAAAGTTTATC
TCGTTAAGAGTGCTTAATCTAGGTGATTCGACATTTAATAAGTTACCATCTTCCATTGGAGATCTAGTAC
ATTTAAGATACTTGAACCTGTATGGCAGTGGCATGCGTAGTCTTCCAAAGCAGTTATGCAAGCTTCAAAA
TCTGCAAACTCTTGATCTACAATATTGCACCAAGCTTTGTTGTTTGCCAAAAGAAACAAGTAAACTTGGT
AGTCTCCGAAATCTTTTACTTGATGGTAGCCAGTCATTGACTTGTATGCCACCAAGGATAGGATCATTGA
CATGCCTTAAGACTCTAGGTCAATTTGTTGTTGGAAGGAAGAAAGGTTATCAACTTGGTGAACTAGGAAA
CCTAAATCTCTATGGCTCAATTAAAATCTCGCATCTTGAGAGAGTGAAGAATGATATGGACGCAAAAGAA
GCCAATTTATCTGCAAAAGGGAATCTGCATTCTTTAAGCATGAGTTGGAATAACTTTGGACCACATATAT
ATGAATCAGAAGAAGTTAAAGTGCTTGAAGCCCTCAAACCACACTCCAATCTGACTTCTTTAAAAATCTA
TGGCTTCAGAGGAATCCATCTCCCAGAGTGGATGAATCACTCAGTATTGAAAAATATTGTCTCTATTCTA
ATTAGCAACTTCAGAAACTGCTCATGCTTACCACCCTTTGGTGATCTGCCTTGTCTAGAAAGTCTAGAGT
TACACTGGGGGTCTGCGGATGTGGAGTATGTTGAAGAAGTGGATATTGATGTTCATTCTGGATTCCCCAC
AAGAATAAGGTTTCCATCCTTGAGGAAACTTGATATATGGGACTTTGGTAGTCTGAAAGGATTGCTGAAA
AAGGAAGGAGAAGAGCAATTCCCTGTGCTTGAAGAGATGATAATTCACGAGTGCCCTTTTCTGACCCTTT
CTTCTAATCTTAGGGCTCTTACTTCCCTCAGAATTTGCTATAATAAAGTAGCTACTTCATTCCCAGAAGA
GATGTTCAAAAACCTTGCAAATCTCAAATACTTGACAATCTCTCGGTGCAATAATCTCAAAGAGCTGCCT
ACCAGCTTGGCTAGTCTGAATGCTTTGAAAAGTCTAAAAATTCAATTGTGTTGCGCACTAGAGAGTCTCC
CTGAGGAAGGGCTGGAAGGTTTATCTTCACTCACAGAGTTATTTGTTGAACACTGTAACATGCTAAAATG
TTTACCAGAGGGATTGCAGCACCTAACAACCCTCACAAGTTTAAAAATTCGGGGATGTCCACAACTGATC
AAGCGGTGTGAGAAGGGAATAGGAGAAGACTGGCACAAAATTTCTCACATTCCTAATGTGAATATATATA
TTTAAGTTATTTGCTATTGTTTCTTTGTTTGTGAGTCTTTTTGGTTCCTGCCATTGTGATTGCATGTAAT
TTTTTTCTAGGGTTGTTTGTTTGTTGAGTCTCTCTCTCATTGGATGTAATTCTCTTTTGGTAACAAATTA
ACAATCTATTTGTATTATACGCTTTCAGAATCTATTACTTATTTGTAATTGTTTCTTTGTTTGTAAATTG
TGAGTATCTTATTGTATGGAATTTTCTGATTTTATTTTGAAAACAAATCAATAAGATCCATCTGCATTAT
ACTCCCTTCGTCTCATTTTATGTGACACTTTTTGGATTTCGAGATTCTTTGATCTTAAATTTTTCATAGA
TCTTTTAAACATTTTGAGTTATCAATTATTGTGATTTTAGTATTTTTTATGTAGTTTACAAATACATAAA
ATTTATTTTTTTTAAAAAAAGAAGATTTCATGCGCAAATTCCCGATCAAACTTAAATTACTAGACTCTCG
AAAAATGAAAAGTGTCACATAAATTGAGACAGAGGGAGTACTTGTTAATGTTGTAATTATTGGCGAACAA
TAATGTTGGTGATTATCACTTTCTGAATAAATGTTGTGTCACGTGGAAAAAACACCAAATAGAAGTATTC
ATGCTTTTTTAGTATATATAAACATGATTTTTAACTTGGTTTCAGCGGATAGTCATGACCTTTAACTCTG
AATGTGCACAAGTAGATACTTGTATAAAATTAAACAAATTTTATAAAATTATACAATATGACACTGAGAG
TAATTGATACCAATTGCAGTCGTTGCTGCTTTTCGATTCTCTGTCATTCTCTAGGTAATTGATTTTACAG
AAAAGGGCCAAAAATATCCCTGAAGTACCAGAAAAGGTCTCAAAATACCAACCATCCACATTTTGGTCTA
AAAATATCCTTCTACTCATCCTTTTTTGTCTAAAATTACCCTTTCATCCACATTTTTGCTCACTTATACC
CTTATAACAACTCTCTCCTTTTTTTTAAAAAAATATTTATTATGTGTCATTTTCTTATTGAATGAAATAA
AAATCCACCTCTATTAATTTTTTCCCATAATTTATCCAAATCAAAACAATATATTTTTTCAAGATCCAAA
AAATATATTTTTTTAAATCTAGTAATTTCTATTTTCTATAGCTTTTTTTCCAAAAAAAAAATGGTTGTTTT
AGATAATTAAAATATCTTTAAAAGTACTAGTCATGCCACAATTATAGGGACATAATATATTAATATAAAT
CCTAAAATATTTTATAATAATATTTTATTATAAAATATATTAATATATTATGTCCCTGTAATTGTGGCAT
GACTAATATTTTTAAAAATATTTTAATTATCTAAAACAATTTTTTTTGGAAAAAAGCTACAGAAAATAGA

## Appendix II



```
351 PLAAKTLGGILCFKREERAWEHVRDSPIWNLPQDESSILPALRLSYHQLP 400
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
351 PLAAKTLGGILCFKREERAWEHVRDSPIWNLPQDESSILPALRLSYHQLP 400

401 LDLKQCFAYCAVFPKDAKMEKEKLISLWMAHGFLLSKGNMELEDVGDEVW 450
    ||||||||||||||||||||.||||||||||||||||||||||||||||||
401 LDLKQCFAYCAVFPKDAKMKKEKLISLWMAHGFLLSKGNMELEDVGDEVW 450

451 KEL*LRSFFQEIEVKDGKTYFKMHDLIHDLATSLFSANTSSSNIREINKH 500
    ||| ||||||||||||||||||||||||||||||||||||||||||||||||
451 KELYLRSFFQEIEVKDGKTYFKMHDLIHDLATSLFSANTSSSNIREINKH 500

501 SYTHMMSIGFAEVVFFYTLPPLEKFISLRVLNLGDSTFNKLPSSIGDLVH 550
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
501 SYTHMMSIGFAEVVFFYTLPPLEKFISLRVLNLGDSTFNKLPSSIGDLVH 550

551 LRYLNLYGSGMRSLPKQLCKLQNLQTLDIQYCTKLCCLPKETSKLGSLRN 600
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
551 LRYLNLYGSGMRSLPKQLCKLQNLQTLDLQYCTKLCCLPKETSKLGSLRN 600

601 LLLDGSQSLTCMPPRIGSLTCLKTLGQFVVGRKKGYQLGELGNLNLYGSI 650
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
601 LLLDGSQSLTCMPPRIGSLTCLKTLGQFVVGRKKGYQLGELGNLNLYGSI 650

651 KISHLERVKNDKDAKEANLSAKGNLHSLSMSWNNFGPHIYESEEVKVLEA 700
    |||||||||||| ||||||||||||||||||||||||||||||||||||||
651 KISHLERVKNDMDAKEANLSAKGNLHSLSMSWNNFGPHIYESEEVKVLEA 700

701 LKPHSNLTSLKIYGFRGIHLPEWMNHSVLKNIVSILISNFRNCSCLPPFG 750
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
701 LKPHSNLTSLKIYGFRGIHLPEWMNHSVLKNIVSILISNFRNCSCLPPFG 750

751 DLPCLESLELHWGSADVEYVEEVDIDVHSGFPTRIRFPSLRKLDIWDFGS 800
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
751 DLPCLESLELHWGSADVEYVEEVDIDVHSGFPTRIRFPSLRKLDIWDFGS 800

801 LKGLLKKEGEEQFPVLEEMIIHECPFLTLSSNLRALTSLRICYNKVATSF 850
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
801 LKGLLKKEGEEQFPVLEEMIIHECPFLTLSSNLRALTSLRICYNKVATSF 850

851 PEEMFKNLANLKYLTISRCNNLKELPTSLASLNALKSL......ALESLP 894
    |||||||||||||||||||||||||||||||||||||      ||||||
851 PEEMFKNLANLKYLTISRCNNLKELPTSLASLNALKSLKIQLCCALESLP 900

895 EEGLEGLSSLTELFVEHCNMLKCLPEGLQHLTTLTSLKIRGCPQLIKRCE 944
    ||||||||||||||||||||||||||||||||||||||||||||||||||||
901 EEGLEGLSSLTELFVEHCNMLKCLPEGLQHLTTLTSLKIRGCPQLIKRCE 950

945 KGIGEDWHKISHIPNVNIYI* 965
    ||||||||||||||||||||
951 KGIGEDWHKISHIPNVNIYI* 971
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Example 6:

The following example shows a nucleic acid comparison between the gene 2 coding regions from a disease resistant and disease susceptible variety. The top sequence is the gene 2 coding region from the resistant homolog. The bottom sequence is the gene 2 coding region

from the susceptible 177013 homolog. Note that the susceptible homolog contains a C to G point mutation at position 1362 that creates a stop codon in second exon at Tyr454 (residue 454 of 970 total), creating a severely truncated protein, in addition to one mismatch (C to T) at codon 10 which doesn't change the amino acid and one sense mutation (T to C) at codon 22 which alters valine to alanine.

```
   1 ATGGCTGAAGCTTTCATTCAAGTTCTGCTAGACAATCTCACTTCTTTCCT 50
     |||||||||||||||||||||||||||| ||||||||||||||||||||
2895 ATGGCTGAAGCTTTCATTCAAGTTCTGTTAGACAATCTCACTTCTTTCCT 2846

  51 CAAAGGGGAACTTGTATTGCTTTTCGGTTTTCAAGATGAGTTCCAAAGGC 100
     |||||||||||||| ||||||||||||||||||||||||||||||||||
2845 CaAAGGGGAACTTGCATTGCTTTTCGGTTTTCAAGATGAGTTCCAAAGGC 2796

 101 TTTCAAGCATGTTTTCTACAATTCAAGCCGTCCTTGAAGATGCTCAGGAG 150
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2795 TTTCAAGCATGTTTTCTACAATTCAAGCCGTCCTTGAAGATGCTCAGGAG 2746

 151 AAGCAACTCAACAACAAGCCTCTAGAAAATTGGTTGCAAAAACTCAATGC 200
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2745 AAGCAACTCAACAACAAGCCTCTAGAAAATTGGTTGCAAAAACTCAATGC 2696

 201 TGCTACATATGAAGTCGATGACATCTTGGATGAATATAAAACCAAGGCCA 250
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2695 TGCTACATATGAAGTCGATGACATCTTGGATGAATATAAAACCAAGGCCA 2646

 251 CAAGATTCTCCCAGTCTGAATATGGCCGTTATCATCCAAAGGTTATCCCT 300
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2645 CAAGATTCTCCCAGTCTGAATATGGCCGTTATCATCCAAAGGTTATCCCT 2596

 301 TTCCGTCACAAGGTCGGGAAAAGGATGGACCAAGTGATGAAAAAACTAAA 350
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2595 TTCCGTCACAAGGTCGGGAAAAGGATGGACCAAGTGATGAAAAAACTAAA 2546

 351 GGCAATTGCTGAGGAAAGAAAGAATTTTCATTTGCACGAAAAAATTGTAG 400
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2545 GGCAATTGCTGAGGAAAGAAAGAATTTTCATTTGCACGAAAAAATTGTAG 2496

 401 AGAGACAAGCTGTTAGACGGGAAACAGGTTCTGTATTAACCGAACCGCAG 450
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2495 AGAGACAAGCTGTTAGACGGGAAACAGGTTCTGTATTAACCGAACCGCAG 2446

 451 GTTTATGGAAGAGACAAAGAGAAAGATGAGATAGTGAAAATCCTAATAAA 500
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2445 GTTTATGGAAGAGACAAAGAGAAAGATGAGATAGTGAAAATCCTAATAAA 2396

 501 CAATGTTAGTGATGCCCAACACCTTTCAGTCCTCCCAATACTTGGTATGG 550
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2395 CAATGTTAGTGATGCCCAACACCTTTCAGTCCTCCCAATACTTGGTATGG 2346

 551 GGGGATTAGGAAAAACGACTCTTGCCCAAATGGTCTTCAATGACCAGAGA 600
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2345 GGGGATTAGGAAAAACGACTCTTGCCCAAATGGTCTTCAATGACCAGAGA 2296

 601 GTTACTGAGCATTTCCATTCCAAAATATGGATTTGTGTCTCGGAAGATTT 650
     ||||||||||||||||||||||||||||||||||||||||||||||||||
2295 GTTACTGAGCATTTCCATTCCAAAATATGGATTTGTGTCTCGGAAGATTT 2246
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```
 651 TGATGAGAAGAGGTTAATAAAGGCAATTGTAGAATCTATTGAAGGAAGGC 700
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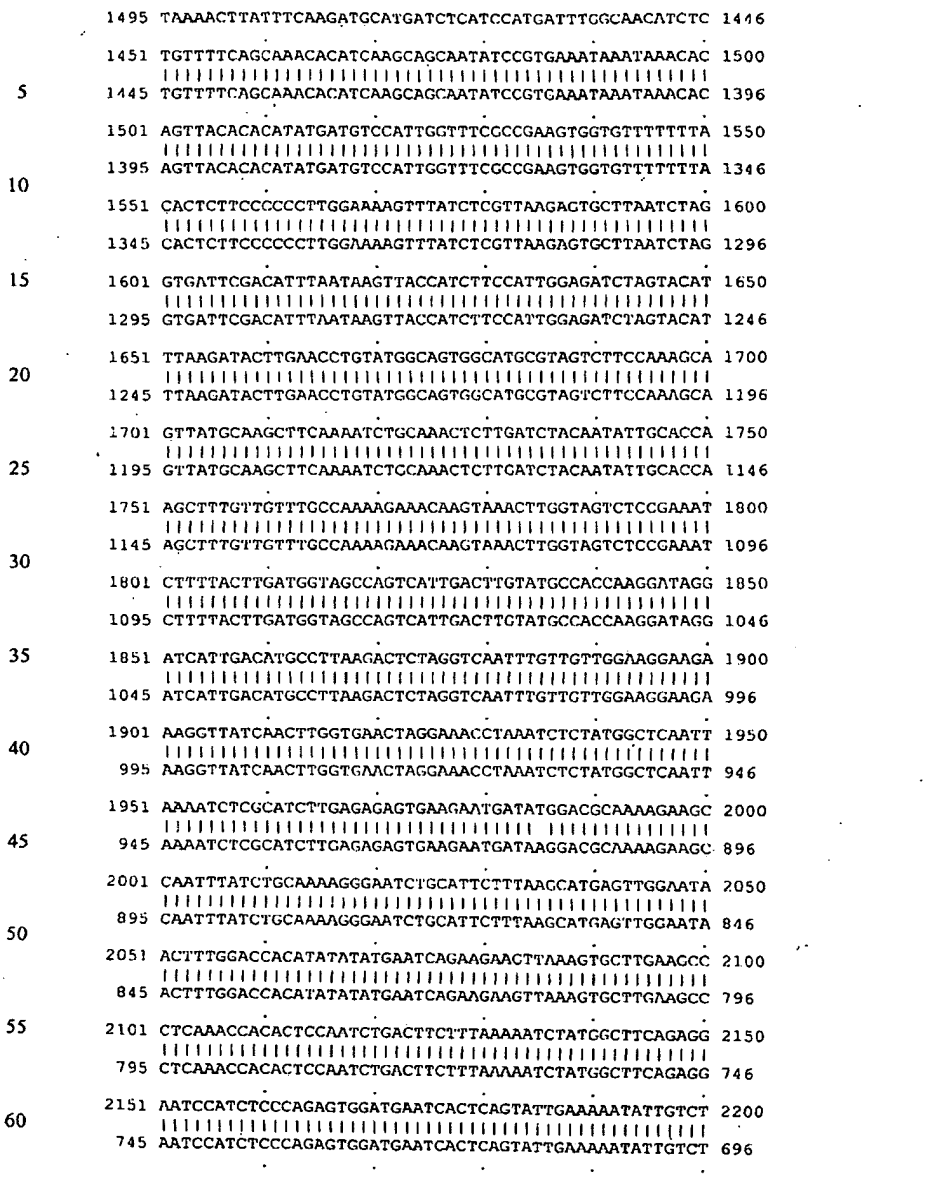
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1345 CACTCTTCCCCCCTTGGAAAAGTTTATCTCGTTAAGAGTGCTTAATCTAG 1296
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745 AATCCATCTCCCAGAGTGGATGAATCACTCAGTATTGAAAAATATTGTCT 696

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2501 GGGCTCTTACTTCCCTCAGAATTTGCTATAATAAAGTAGCTACTTCATTC 2550
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     |||||||||||||||||||||||||||||||| ||||||||||||||||
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2701 GAGGAAGGGCTGGAAGGTTTATCTTCACTCACAGAGTTATTTGTTGAACA 2750
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## Appendix III



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**SEQ ID NO:5**: Gene 2 protein sequence (from the resistant homolog)

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TELFVEHCNMLKCLPEGLQHLTTLTSLKIRGCPQLIKRCEKGIGEDWHKISHIPNVNIYI

**SEQ ID NO:6**: Nucleic acid sequence of disease resistant gene, gene 3 (from the resistant homolog)

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